

REMARKS

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In order to provide adequate coverage for applicant's contribution to the art, new claim 34, dependent from claim 1, has been added. Claim 34 calls for the mat to have a permeability of at least about 250 cfm/ft² measured in accordance with ASTM Standard D737 at a differential pressure of 0.5 inches of water.

Support for the presentation of claim 34 is provided by the original specification, including original claim 32. Accordingly, no new matter has been added.

Claims 4, 6, 8, 10, and 24 have previously been cancelled, and claim 30 stands withdrawn as being directed to a non-elected invention.

Applicant' invention, as recited by presently pending claims 1-3, 5, 7, 9, 11-23, 25-29, and 31-34, as amended, provides a nonwoven, fibrous mat comprising a blend of a major portion composed of chopped glass fibers having an average fiber diameter of about 11 ± 1.5 µm and a minor portion composed of fine staple fibers having an average fiber diameter of less than about 5.5 µm. The minor portion is composed of glass or mineral fibers and comprises about 1-30 percent of the dry weight of the web. Also provided is a gypsum board faced with such a mat. In various embodiments, the gypsum board exhibits a combination of desirable structural and functional features that render it fire resistant and easily painted or otherwise given an aesthetically pleasing finish after installation with a minimum of surface preparation required. The mat has a high permeability, permitting easy extraction of excess

water ordinarily present during slurry-based manufacture of gypsum or other hydraulic set board. Surprisingly and unexpectedly, gypsum board faced in accordance with the invention with the present nonwoven glass fiber mat, has a smoother surface than boards made with known mats employing fibers having either larger or smaller average diameter. It is especially surprising and significant that the aforementioned fiber blend results in smoother board than would otherwise be obtained in prior art mats made with fibers having a single average diameter.

Claims 1-3, 5, 7, 9, 11-23, 25-29, and 31-33 were rejected under 35 USC 103(a) as being unpatentable over US Patent 4,647,496 to Lehnert in view of US Patent 4,637,951 to Gill.

Lehnert et al. provides an exterior finishing system for a building, such as a fibrous mat-faced gypsum board having a water resistant, set gypsum core.

The Examiner has stated that Lehnert teaches a fibrous mat-faced gypsum board comprised of a gypsum core that is sandwiched between two sheets of glass mat. It is further alleged that Lehnert teaches glass fibrous mat made from chopped fiber in a resinous binding, such as modified urea-formaldehyde. Applicant respectfully observes that Lehnert calls for facers that are porous glass fiber mats. See, e.g., col. 4, line 57. In addition, Lehnert discloses gypsum that penetrates "but part-way into the thickness of the mat" of one board face (col. 4, lines 59-60) and "substantially through the thickness of the mat" at the

other face (col. 5, lines 5-6 and 24-31). It is said to be necessary for the mats to be permeable to allow the high water content of the gypsum slurry to be extracted as liquid or vapor during the production and board curing (col. 9, lines 8-16).

The Examiner has admitted that Lehnert does not teach the fiber sizes and compositions of the glass fibrous mats recited by applicant's independent claims 1, 29, 31, 32, and 33. Accordingly, she has cited Gill et al., which is directed to a fibrous mat facer said to exhibit improved strikethrough resistance. The mat is said to be especially suited as a carrier, substrate, or facer for various curable materials that are placed on one surface of the mat while in a liquid state. Gill et al. further discloses a laminate comprising the foregoing mat and a vinyl plastisol coating or a coating of a foam insulation material such as polyurethane or polyisocyanurate foam.

Applicant respectfully traverses the Examiner's contention that the combination of Lehnert and Gill discloses or suggests the subject matter of applicant's claims, as well as the propriety of combining the references in the manner proposed.

Gill et al. addresses the problem of strikethrough as a significant difficulty in the production of laminate materials. See, e.g., col. 1, lines 27-30. Gill et al. requires the presence of two types of glass fibers, viz. base fibers having a diameter between 8 and 25 microns and microfibers having a mean diameter in the neighborhood of one micron. Col. 3, lines 7-12 and 27-30. It is said that the selection of diameter of the base fibers is determined by process restraints, which limit the lower diameter, and the hand or feel of the

mat, which restricts the upper limit. Col. 3, lines 14-19 and 21-26. Applicant respectfully submits that for a skilled artisan, such teaching would lead to selection of the smallest possible fiber. Specifically, applicant maintains that the skilled person would interpret the Gill teaching as suggesting the smallest possible diameter. By way of contrast, applicant's glass mat employs fibers having a narrow range of $11 \pm 1.5 \mu\text{m}$, a size range larger than the minimum of $8 \mu\text{m}$ provided by Gill. There is no disclosure or suggestion that would disclose or suggest, or controvert, applicant's surprising and unexpected finding that mat having such a size of base fibers, larger than the minimum of Gill et al.'s base fibers, can nonetheless be used to produce gypsum board having a smooth surface, that can directly accept paint in an aesthetically pleasing manner. See, e.g., the specification at page 4, lines 10-13; page 9, lines 7-14; and Example 6 (page 19, line 19, through page 20, line 7), and §§18-22 of the Declaration Under 37 CFR 1.132 of Alan M. Jaffee submitted December 26, 2006.

Furthermore, the fibrous mat provided by Gill et al. is used for an entirely different purpose than applicant's mat. In particular, the Gill mat is said to be especially useful when forming composite materials employing a curable thermoset, such as a foamable material such as a polyurethane or polyisocyanurate rigid foam board, or as a carrier web in the vinyl flooring industry. In both instances, the mat is said to be "resistant remarkably" to strikethrough. The Gill et al. disclosure is conspicuously devoid of any reference to gypsum or other cementitious construction board. On the other hand, the Examiner has alleged that

it would have been obvious at the time of the invention to combine the fibrous mats of Gill in the structure of Lehnert to produce an improved gypsum board. However, this contention is submitted to be nothing more than conclusory hindsight, the Examiner having not provided any basis that would suggest even the possibility that applicant's particular combination provides the allegedly obvious improved properties, despite conventional wisdom that would suggest a very different approach, namely use of fibers having the smallest possible diameter. It is thus submitted that the basis for the combination proposed falls short of the documentation standard articulated by the Federal Circuit. See *In re Lee*, 277 F.3d 1338, 1344-45, 61 U.S.P.Q.2d 1430, 1435 (Fed. Cir. 2002) (finding that reliance on "common knowledge and common sense" did not fulfill the PTO's obligation to cite references to support its conclusions as PTO must document its reasonings on the record to allow accountability and effective appellate review).

Applicant further points to the low air permeability of the Gill mat as leading the skilled artisan away from the combination proposed, particularly with respect to preferred claim 32 and new claim 34, which recite a Frazier air permeability of at least about 250 cubic feet per minute. Nothing in Gill relates to board materials in which water vapor is extracted during board curing, since the material to be faced with the Gill mats is not an aqueous slurry, but rather a curable polymer such as foamable material such as a polyurethane or polyisocyanurate rigid foam. The Gill mat is further differentiated, since it is said to inhibit strikethrough, whereas embodiments of the Lehnert gypsum material require at least some

amount of strikethrough to achieve the preferred structure delineated by Lehnert, e.g. at col. 5, lines 24-27. In context, these factors would provide a skilled artisan no basis even to try the Gill mat. Rather, the artisan would instead eschew the Gill mat for making gypsum board, based on Gill's teaching pertaining to inhibited strikethrough. Were the Gill teaching to be modified to provide a mat having applicant's increased permeability, it would be highly likely not to attain the objective of inhibiting strikethrough. Such a result is submitted to preclude the reconstruction proposed by the Examiner, in view of *In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984). See also *Monarch Knitting Mach. Corp. v. Sulzer Morat GmbH* ["A prior art reference may be considered to teach away when 'a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.'" 139 F.3d 877, 45 USPQ2d 1977, 1984 (Fed. Cir. 1998), quoting *In re Gurley*, 27 F.3d 551, 553, 31 USPQ2d 1130, 1131 (Fed. Cir. 1994).] and *McGinley v. Franklin Sports, Inc.* ["We have noted elsewhere, as a 'useful general rule,' that references that teach away cannot serve to create a *prima facie* case of obviousness." 262 F.3d 1339, 1354, 60 U.S.P.Q.2d 1001 (Fed. Cir. 2001) (citing *In re Gurley, supra*)].

The Examiner has pointed to Gill's example 3 at col. 6, lines 1-10 as allegedly disclosing a Frazier air permeability of 220 cubic feet per second and has converted that quantity to an equivalent of 13,200 ft³/minute. However, applicant respectfully submits that a person having ordinary skill in the art would recognize the Examiner's proposed reading as

being implausible and that the units in the cited passage reflect a typographical error, cubic feet per minute having been intended. Significantly, the Gill patent includes some eight other references to air permeability, each being set forth in units of cubic feet per minute. See: (i) abstract, second paragraph; (ii) col. 2, lines 26-27; (iii) col. 5, line 59; (iv) col. 6, line 5; and (v) claims 2, 3, 10, and 12. Nowhere else in Gill is the unit "cubic feet per second" used. In addition, in a detailed discussion of the Frazier test at col. 5, lines 9-26, Gill et al. expressly state that "The resulting reading on the test gives the cubic feet per minute of air which can pass through each square foot of the mat." Lines 19-22, emphasis added. It would be incongruous for a skilled artisan not to question a remarkable sixty-fold jump in air permeability from Example 2 to Example 3 the Examiner's interpretation necessarily entails. The Gill specification is devoid of any comment that relates to a change in units or to a radical increase in permeability that would have been expected.

Moreover, the Examiner's proposed reading would vitiate the exemplary value of Example 3. That is to say, the preferred mats recited by claims 2, 3, 10, and 12 are characterized by an air permeability that has an upper bound. Specifically, the air permeability is no more than a recited value of 225 cubic feet per minute (claims 2 and 10) or is between recited values of 40 and 225 cubic feet per minute (claims 3 and 12). Were the Examiner's proposed reading correct, then Example 3 would not support any of these preferred claims, the Examiner's presumed air permeability being some sixty times too high to support the claims. On the other hand, applicant maintains the skilled artisan would

recognize "cubic feet per second" at col. 6, line 5, as a typographical error, "cubic feet per minute" having been intended, so that Example 3 would in fact directly support the preferred claims. The skilled artisan would be further led to such a reading by recognizing that a mat sufficiently permeable to sustain the radically higher flow rate of 13,200 cubic feet per minute the Examiner infers would almost certainly fail to achieve the central objective of Gill et al., namely provision of a mat invulnerable to strikethrough. Applicant thus submits the Examiner's reading is untenable and contrary to the understanding a skilled person would give.

Applicant further traverses the Examiner's contention that values of air permeability provided by Gill et al. cannot be compared with those of applicant because of the different pressure values used. In particular, Gill et al. employs a manometer differential pressure of 5 inches using a red oil manometer fluid having a specific gravity of 0.827, whereas applicant calls for a 0.5 inch water differential. It is respectfully submitted that a person having ordinary skill would ascertain that the Gill oil differential corresponds to a water differential of about 4.1 inches of water (i.e., 0.827×5). It is further submitted that the skilled person would recognize, based on knowledge of fluid flow from elementary physics, that a higher differential pressure would result inexorably in a higher flow rate. The skilled person would thus recognize that had Gill et al. measured under applicant's 0.5 inches of water differential, the Gill et al. permeability would have been even lower, further differentiating the low Gill values from applicant's high values. Thus, the Examiner's appeal to *In re Fitzgerald*, 619

F.2d 67, 205 USPQ 594 (CCPA 1980) with respect to the measurement of air permeability is submitted to be misplaced, since it is within the level of routine skill to make the foregoing compensation for the difference in measurement methodology.

For at least these reasons, it is submitted that the combination of Lehnert and Gill does not disclose or suggest a gypsum or other hydraulic set board having the outstanding combination of structural and functional properties afforded by the gypsum board recited by present claims 1-3, 5, 7, 9, 11-23, and 25-29, the facer of claims 31-32, and the hydraulic set board of claim 33.

Accordingly, reconsideration of the rejection of Claims 1-3, 5, 7, 9, 11-23, 25-29, and 31-33 under 35 USC 103(a) as being unpatentable over the combination of Lehnert and Gill is respectfully requested.

Claims 2, 3, 9, 11, and 18 were rejected under 35 USC 103(a) as being unpatentable over Lehnert in view of Gill in further view of US Patent 5,389,716 to Graves, which discloses a binder composition for fibrous mats that is said to be fire resistant when cured. The mats are said to be suitable for a backing layer for gypsum.

Applicant respectfully submits that the addition of Graves fails to cure the failure of Lehnert and Gill, even in combination, to disclose or suggest the invention of claim 1, from which claims 2, 3, 9, 11, and 18 depend directly or indirectly.

Recognizing the failure of Lehnert and Gill to teach certain claim features, e.g. E glass, C glass, T glass, sodium borosilicate glass, and mixtures thereof, the Examiner has pointed to Graves. In addition, Graves is cited as allegedly providing glass fibers of various sizes and teaching increase of the tear resistance and tensile strength of the mat and improvement of the folding and working quality of the mat. The Examiner also noted Graves' reference to Gill at col. 11, lines 11-20. However, applicant maintains that the Examiner has not established that any of the foregoing characteristics are even likely to be attained with the particular fiber composition delineated by claim 1, let alone that of preferred claims 2, 3, 9, 11, and 18. It is also submitted that even in possession of Gill, Graves did not make any of the specific combinations delineated by any of applicant's claims, and particularly did not recognize the potential for improved smoothness afforded by the mat of applicant's claims.

The Examiner has purported a motivation to combine Graves with Lehnert and Gill, based on the properties of glass fibers as taught by Graves. Such a motivation is again submitted to be merely conclusory, there being no indication to establish that a person having ordinary skill in the art and in possession of with Graves would in fact reach the preferred subject matter of base claim 1, let alone claims 2, 3, 9, 11, and 18. While Graves admittedly discusses a wide variety of desirable qualities of mat, the Examiner has not pointed to any basis on which a skilled person would select from the exceedingly wide range of possibilities inherent in the alleged combined disclosure of Lehnert, Gill, and Graves the limited range of composition and fiber characteristics delineated by applicant. The Examiner also does not

provide any basis, even with Graves, that would establish that the smoothness attained by board made with applicant's mat would be improved by selection of base fibers that are not the smallest diameter, contrary to the teaching of Gill.

Applicant thus submits that the subject matter of preferred claims 2, 3, 9, 11, and 18 is not obvious over the combination of Lehnert, Gill, and Graves.

Accordingly, reconsideration of the rejection of claims 2, 3, 9, 11, and 18 under 35 USC 103(a) as being obvious over the combination of Lehnert, Gill, and Graves is respectfully requested.

Claims 18-22 were rejected under 35 USC 103(a) as being unpatentable over Lehnert in view of Graves and further in view of US Patent 6,723,670 to Kajander et al., which is directed to a foam coated nonwoven fibrous mat said to have properties rendering it particularly suited for a facer on gypsum wallboard.

Recognizing the failure of Lehnert to disclose a resinous binder comprising a melamine formaldehyde cross-linker, the Examiner has cited Kajander et al.

Significantly, the rejection of claims 18-22, which does not include the Gill reference as applied to claim 1 above, fails to articulate any basis to establish the obviousness of the dimensions and characteristics of the glass fiber required by claim 1 and thus inherited by claims 18-22. Nothing in Lehnert or Graves, either singly or in combination, is cited to

provide these features. Applicant respectfully maintains that Kajander et al. does not cure this deficiency.

Furthermore, the gypsum wallboard of Kajander et al. is distinguished from conventional wallboard by the incorporation of the foamed facer. In particular, the formation of the Kajander mat includes, as an integral part of its production, the deposition of a foam layer on top of the wet non-woven fibrous bindered web layer. The foam and the fibrous layer then are jointly cured. During subsequent gypsum board production, an unbound surface of the mat is applied to the board core. See col. 6, lines 44-55. Significantly, it is said that glass fibers of any diameter can be used, with 13 and 16 μm diameter fibers being preferred. Col. 7, lines 19-23. It is further stated that a substantial advantage of the Kajander et al. invention is that it enables use of larger, less expensive fibers, which are expressly distinguished from 9 and 10 μm diameter fibers. Col. 7, lines 25-27 and 30-32. It is thus submitted that the skilled person would be led away from the selection of a mixture of $11 \pm 1.5 \mu\text{m}$ base fibers and smaller microfibers delineated by applicant's claim 1, from which claims 18-22 depend.

Accordingly, reconsideration of the rejection of claims 18-22 under 35 USC 103(a) as being obvious over the combination of Lehnert, Graves, and Kajander et al. is respectfully requested.

In addition, applicant respectfully notes that US Patent 6,723,670 is assigned on its face to Johns Manville International, Inc. US Patent Application Serial No. 09/923,932,

from which the '670 patent issued, was assigned by the inventors to Johns Manville on July 30, 2001, the assignment having been recorded on August 7, 2001 at Reel 012067, Frame 0435. The '670 patent issued on April 20, 2004, subsequent to the June 23, 2003 filing date of the present application, and was previously published on February 13, 2003 as US 2003/0032350. The present application is also owned by Johns Manville International, Inc., by way of assignment executed by the inventor on August 20, 2003 and recorded on November 5, 2003 at Reel 104676, Frame 0541.

By virtue of their publication dates, neither US Patent 6,723,670 nor US Patent Publication No. US 2003/0032350 is available as prior art against the present application under 35 USC 102(b). It is further submitted that under the provisions of 35 USC 103(c) and by virtue of common ownership, neither the '670 patent nor the '350 published application is available as prior art under 35 USC 102(e), (f), or (g) against the present application in an obviousness rejection under 35 USC 103(a).

Accordingly, withdrawal of the rejection of claims 18-22 under 35 USC 103(a) as being unpatentable over Lehnert, Graves, and Kajander et al. is also respectfully requested in view of 35 USC 103(c).

Claims 16 and 25-28 were rejected under 35 USC 103(a) as being unpatentable over Lehnert in view of US Patent Publication US 2004/0209071 to Carbo et al., which discloses acoustical tiles, also known as acoustical panels, ceiling tiles, or ceiling panels, that are said to inhibit the growth of fungus, bacterial and other micro-organism.

The Examiner has asserted that Lehnert teaches a fibrous mat-faced gypsum board comprised of a gypsum core that is sandwiched between two sheets of glass mat. However, claims 16 and 25-29 all depend from claim 1 and inherit its limitations. As set forth hereinabove in connection with the rejection of claim 1 over Lehnert and Gill, applicant maintains that Lehnert, even if it were to be combined with Gill, fails to disclose or suggest the particular composition and glass fiber characteristics delineated by claim 1.

Applicant thus respectfully disagrees that Lehnert teaches the claimed invention except for a biocide contained in the core, for at least the reasons set forth hereinabove in connection with the obviousness rejection of claims 1-3, 5, 7, 9, 11-23, 25-29, and 31-33 over Lehnert and Gill. Recognizing the failure of Lehnert to disclose or suggest any biocide, the Examiner has further cited Carbo et al. However, applicant maintains that Carbo et al. fails to cure the lack of disclosure or suggestion of a gypsum board employing the nonwoven mat facers delineated by claim 1, from which claims 16 and 25-28 depend.

Furthermore, applicant submits that any disclosure of Carbo et al. relating to biocides is at best pertinent to claim 26, but not to claims 16, 25, and 27-28, which do not recite a biocide of any form, nor do they depend from claim 26. The Examiner has not provided any separate comments that establish the specific pertinence of either Carbo et al. or Lehnert to claims 16, 25, and 27-28 and fulfill the requirements of MPEP 706.02(j) concerning the rejection of claims. ["The examiner should set forth in the Office Action: (A) the relevant teachings of the prior art relied upon, preferably with reference to the relevant column or page

number(s) and line number(s) where appropriate. *In re Hoch*, 428 F.2d 1341, 1342 n.3, 166 USPQ 406, 407 n. 3 (CCPA 1970).”] and 37 CFR 1.104(c)(2) [“When a reference is complex or shows or describes inventions other than that claimed by the applicant, the particular part relied on must be designated as nearly as practicable. The pertinence of each reference, if not apparent, must be clearly explained and each rejected claim specified.”]. In the present instance, it is submitted that the Carbo et al. or Lehnert references are complex, in the sense of that term as used in 37 CFR 1.104, and that Carbo et al. or Lehnert describe inventions other than that claimed by the applicants. Specificity of the rejection is further required under *In re Lee*, 277 F.3d 1338, 1344-45, 61 U.S.P.Q.2d 1430, 1435 (Fed. Cir. 2002) (finding that PTO must document its reasonings on the record to allow accountability and effective appellate review).

As a result, it is submitted that the Examiner has not established the *prima facie* obviousness of claims 16 and 25-28 over Lehnert and Carbo et al., even in combination. Applicant maintains that these references do not disclose or suggest a gypsum board having the outstanding combination of properties afforded by the board recited by present claims 16 and 25-28.

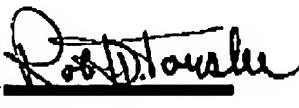
Accordingly, reconsideration of the rejection of claims 16 and 25-28 under 35 USC 103(a) as being obvious over the combination of Lehnert and Carbo et al. is respectfully requested.

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In view of the foregoing remarks, and the Rule 132 Declaration by Alan M. Jaffee submitted on December 26, 2006, it is respectfully submitted that the present application has been placed in allowable condition. Reconsideration of the rejection of the present application and allowance of claims 1-3, 5, 7, 9, 11-23, 25-29, and 31-33, as amended, together with new claim 34, are earnestly solicited.

Respectfully submitted,

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